nascent creature; and that the young animal is nothing more than a fully developed seminal filament. Accordingly, it was assumed that the egg only contained the requisite nutriment for the sustenance and development of the seminal filament. Now, if this were in reality the germ of the nascent creature, the constitutional properties must be inherent in the drone. But every bee breeder is aware of the fact that an unimpregnated queen lays eggs which produce drones exclusively; and he further knows that worker bees occasionally lay eggs from which living creatures are developed, and that these are invariably drones. From these facts it is evident that *the egg contains the germ of the young bee.* Let us now inquire what observation and experiment further teach. I crossed pure Egyptian queens with Italian drones. In the hybrid progeny, the constitutional properties — the temperament — of the Egyptian seemed completely obliterated, as it were, and those of the Italian substituted. I next crossed the Italian queens with Egyptian drones, and the progeny displayed the Egyptian characteristics wholly. Hence, it was manifest that *the temperament of the bee resides in the seminal filament.* Accordingly, in our endeavors to provide an improved breed, our attention must be preëminently directed to the drones by which the selected queen is to be fertilized. We come now to the question whether drones possess diversities of temperament; but the elucidation of this branch of our topic would occupy too much time at present. I may perhaps have occasion hereafter to discuss it.

Some may dissent from the views I have here expressed, but we cannot disagree in our object, namely, by steadfast endeavor and close scrutiny to attain to the knowledge of the truth which the Omniscient has embodied in that very diminutive member of animated nature, the Honey Bee.

HABITS OF THE PRAIRIE DOG.

BY PROF. B. C. JILLSON, PH.D.

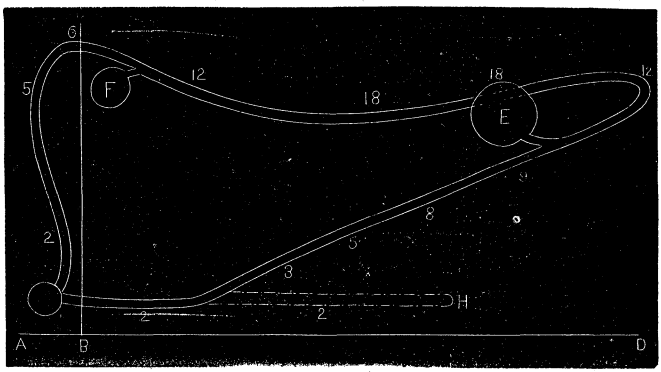
October 26th, 1869, I received two Prairie Dogs, which had been forwarded from Cheyenne, Wyoming Territory. They were about the same size, each measuring thirteen inches in length, the

tail being three and an eighth inches long. For want of a better place they were kept until spring in one of the large rooms of the university building, where a box was assigned for their especial use, with full permission to run about as they chose, provided they remained on their good behavior. Hardly had they been placed in their new quarters when they began to make a foraging expedition about the room, and discovering several boxes of choice mineralogical specimens wrapped in soft paper, pronounced the latter article confiscated, and proceeded to appropriate it to their own use. Seizing the paper with their teeth they would soon strip the specimen, and sitting on their hind legs, and using their paws as hands, would cram their mouth and cheek pouches with the plunder — the long ends protruding — and then with a peculiar ambling gait cross the room, and, having deposited their load under a case of apparatus, quickly return for more. This was continued for several days, till they had gathered an immense quantity of warm material composed of every scrap of wood or paper that could be obtained. Not satisfied with this wholesale plundering, they commenced an indiscriminate gnawing of table legs, cabinet cases, boxes, etc., in fact everything upon which they could exercise their sharp incisors except the stove, which I noticed they carefully avoided after once trying their skill upon it. So troublesome did they at length become, that they were confined to their box, and only occasionally permitted to run at large under a watchful eye. At such times they would amble about the room, occasionally stopping and whisking their tail in a most amusing manner. At the slightest noise they would raise themselves upon their hind legs, with their fore legs hanging down in front, and with a quick, sharp, intelligent look in all directions, endeavor to discover the cause of the disturbance. They soon became very tame, coming when called, and eating from my hand, though they would sometimes give strangers who were too familiar, a pretty sharp nip. Their food consisted of the blade, stock, and grain of corn, the blades and roots of grass, cabbage leaves, celery tops, apples, nuts, etc. Of peanuts they were very fond, but of nuts with a hard shell they seemed to have no conception whatever. Taking them in their paws, they would try their teeth upon them, and then let them drop in apparent disgust; in this respect acting very differently from their near relatives, the squirrels. When the nuts were cracked, however, they seemed to enjoy them as a great luxury. Their peculiar, short, quick and sharp voice

was often exercised for the amusement of my friends. At a peculiar chirrup of mine, they would quickly assume an erect posture, their fore paws hanging in front, their heads raised as high as possible, and with mouth turned upwards, give forth a sound so nearly resembling the yelp of a domestic puppy, as to confer on these peculiar animals, the familiar, though by no means appropriate, name of Prairie Dogs. At each cry they jerked their tails, as if it cost them an effort to speak so loud. They were very affectionate, seldom quarrelling, and often standing with their fore paws on each other's shoulders, rubbing their noses together. I once discovered that one of them had crawled through a small hole, and was wandering about between the laths and outside of the building. As often as I called, it would answer, and at length discovering that it had found its way to the ceiling, I removed a board from the floor of the room above and releasing it, returned it to its companion. The demonstrations of affection which followed would put to shame many a couple of higher intelligence. The next day the other one had not been released ten minutes, when it too passed through the same hole, and probably following the track of its predecessor, was finally removed from the same opening. On being returned to its quarters, demonstrations were indulged in, similar to those of the preceding day. During the greater part of December, January and February, they lay in a dormant state, although there was usually a fire in the room six days in each week. They were generally found occupying the centre of their paper heap, coiled up in such a way as to resemble two small parcels of fur. Their temperature was so much reduced that they seemed cold to the touch, and often provoked the remark from strangers "They are dead, *stone* dead." They never opened their eyes, and showed by their actions that they desired nothing so much as to be let alone. Towards the close of February they began to exhibit signs of returning life, occasionally leaving their box, to which, however, they would soon return. Early in the spring I took them to my home a few miles from the city, and placed them in a large pen where they had abundant opportunity of enjoying their well known digging propensities. Having selected a corner they commenced their labors and were soon out of sight. In a few days they had raised a mound around the entrance one foot and a half in height and two feet in diameter. Their under-ground work, however, seemed never completed, for they were constantly throwing dirt from the hole. In digging,

they used their fore feet, throwing the dirt some distance to the rear with their hind feet. Sometimes they turned around and pushed the dirt before them with their paws. They had a singular habit of using their noses as miniature battering-rams, and were constantly bunting the earth about their pen in this manner. They spent much of their time—sometimes one, and sometimes both—sitting erect on their mound with their paws hanging down in front, apparently taking a survey of their narrow quarters. At the slightest noise, they would dart into their hole shaking their little tails in a most comical and derisive manner. Hardly had they disappeared, however, when their heads would stealthily reappear with a gaze of curiosity and impertinence. Though apparently so timid, they sometimes exhibited an adventurous spirit, as shown by their frequent climbs to the roof of the adjoining coal-shed, while their hasty and awkward scrambling to get down was sometimes amusing to behold. Wishing to examine their under-ground habitation, I commenced November 24th, to dig them out. As their burrow passed under the coal shed, its depth was probably modified by this circumstance, and the task was not so great as I at first supposed.

Fig. 7.

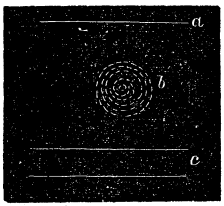


Burrow of the Prairie Dog.

In the above sketch, *A B C* represents the outline of that corner of the pen in which their hole was commenced, and *C B D* the sides of the coal-shed under which they burrowed. The passages were about three and a half inches in diameter, and nearly round, being slightly flattened from above, downward.

Their depth is indicated in inches by the figures in the cut, the measurements being taken from the top of the passage to the surface of the ground. *E* shows the position of a side excavation, spherical in shape, and twelve inches in diameter, which, when opened, was found filled with dried grass, corn fodder, etc. *F* was also spherical, nine inches in diameter, and empty. *H* was a blind passage, or *cul de sac*, three feet in length, packed solid with grass and little masses of dirt, the object doubtless being to keep moist the winter's supply of food; the packing being accomplished by the bunting process already described. The burrow passed under *E* as indicated by the dotted lines, and as shown by the section in the margin, where *a* represents the surface of the ground, *b* one side of the granary *E*, and *c* the passage way beneath. The distance from *a* to *b* was eight inches, the width of *b* at this point six inches, and the distance from *b* to *c* four inches. The total length of under-ground excavation was about twenty-five feet. The question is often asked, does the Prairie Dog require any water? The gentleman who brought mine on, said he had had them two months, during which time he had given them nothing to drink. I received them October 26th, 1869, and from that time to the 1st of May, 1870, I am *sure* they drank nothing. March 11th and April 3d, I placed a dish of water before them. Each time they merely smelt of it, and turned away without drinking a drop. From the 1st of May to the last of November, they occupied their summer quarters, and though always rejecting the water placed before them, they may have received an abundant supply from the falling rain, the dew, and the moist earth. During the month of December, 1870, one of them drank four times, viz., on the 7th, half an ounce; the 9th, two ounces; the 14th, one and a half ounces; the 20th, one and a half ounces, and on the 22d, commenced its winter nap.

Fig. 8.



Section of Burrow.

It is often recorded in the books, that the Prairie Dog, owl and rattlesnake live lovingly together in the same hole. I have seen many "dogtowns" with owls and dogs standing on contiguous, and in some cases, on the same mound, but never saw a snake in the vicinity. I have conversed with many frontiersmen and have

yet to find one who will acknowledge his belief in this singular phenomenon. In a region of country, where snakes are so abundant as in some parts of the West, it would be very strange if they were not occasionally found in "dogtowns" as well as elsewhere. In the room in which my dogs were confined, was a cage containing two full-grown, living rattlesnakes. This gave me an excellent opportunity for testing the friendship of these animals for one another; but my cautious skepticism exceeded my curiosity, and my little friends did not, this time at least, fall victims to scientific experiments.

THE FLIGHT OF BIRDS AND INSECTS.

THE few last numbers of the French "Revue des Cours Scientifiques" (Nos. 36, 38, 40, 1870), which has been suspended since the siege of Paris, contain the reports of a course of lectures by M. Marey on this interesting subject. The distinguished lecturer has brought to bear on this difficult theme rare experimental and mechanical tastes, added to a nicety of manipulation characteristic of his countrymen.

Who of us, as remarked to the translator by an eminent ornithologist, can even now explain the long sustained, peculiar flight of the hawk, or turkey buzzard, as it sails in the air without changing the position of its wings? and, we would add, the somewhat similar flight of a butterfly? It is the poetry of motion, and a marvellous exhibition of grace and ease, combined with a wonderful underlying strength and lightness of the parts concerned in flight.

Before we give a partial account of the results obtained by the delicate experiments of Professor Marey, our readers should be reminded of the great differences between an insect and a bird, remembering that the former is, in brief, a chitinous sac, so to speak, or rather a series of three such spherical or elliptical sacs (the head, thorax and abdomen); the outer walls of the body forming a solid but light crust, to which are attached broad, membranous wings, the wing being a sort of membranous bag stretched over a framework of hollow tubes, so disposed as to give the greatest